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Extra-intestinal trematodes in birds of the mesotrophic lakes: Gołdapiwo and Mamry Północne

Przywry pozajelitowe ptaków jezior mezotroficznych Gołdapiwo i Mamry Północne

The present paper deals with the extra-intestinal trematodes in birds from the Gołdapiwo (1954—1955) and Mamry Północne (1956—1957) lakes. It is a further continuation of my own paper on intestinal trematodes (Sulgostowska, 1960). The purpose and methods of work were indicated in the mentioned paper.

All the birds examined, their invasion with extra-intestinal trematodes, the total number of species of the latter and the occurrence of trematodes families in the particular bird species are given in Table I. It is evident from that table that extra-intestinal trematodes invasion will develop much the same as intestinal trematodes invasion. It means that the higher extent, intensity of invasion as well as the highest degree of diversity of species was noted in *Anatidae* and in *Fulica atra* from the *Rallidae* family. Then the carnivorous birds followed: *Phalacrocoracidae, Accipitridae, Ciconiidae, Podicipedidae, Ardeidae, Laridae* with considerable extent of invasion but with less important diversity of species. No extra-intestinal trematodes were found in the *Charadriidae, Alcedinidae* and *Passeriformes*, the *Tringa totanus* excepted.

I found on the lakes Gołdapiwo nad Mamry Północne the total number of 19 species of non-intestinal trematodes of birds, belonging to 7 families. In the Table II is shown the arrangement of those species, the total number of trematodes found, the number of host-species on the lakes and the number of examined and of the invaded hosts. It shows that on the lake Gołdapiwo 15 species of trematodes were found, and on the lake Mamry Północne — 18. The fauna of trematodes on both the lakes are generally identical.

Table I

Number of birds invaded and invasion of birds with representatives of trematode families

No	Bird species	Lake Gołdapiwo		Lake Mamry Północne		Total			No. of found trematode species	*Cyclocoelidae*	*Dicrocoeliidae*	*Echinostomatidae*	*Eucotylidae*	*Renicolidae*	*Opisthorchiidae*	*Schistosomatidae*
		exam.	invad.	exam.	invad.	exam.	invad.	%								
	Anatidae															
1.	*Anas crecca* L.	1	0	1	1	2	1		1							+ +
2.	*Anas platyrhynchos* L.	37	35	7	6	44	41	93	5	+			+		+	+ +
3.	*Anas strepera* L.	—	—	4	1	4	1		1	+						
4.	*Anas querquedula* L.	10	7	4	4	14	11	79	3	+						+
5.	*Aythya ferina* (L.)	5	3	13	10	18	13	72	3				+		+	+ +
6.	*Aythya fuligula* (L.)	6	5	1	1	7	6	86	5	+			+		+	+ +
7.	*Aythya marila* (L.)	5	3	—	—	5	3	60	2				+			+ +
8.	*Aythya nyroca* (Guld.)	8	3	2	2	10	5	50	2	+						+
9.	*Anser anser* (L.)	2	0	—	—	2	0	—	—							
10.	*Bucephala clangula* (L.)	—	—	1	0	1	0	—	—							
11.	*Mergus merganser* (L.)	—	—	1	0	1	0	—	—							
	Total	74	56	34	25	108	81	75								
	Accipitridae															
12.	*Accipiter gentilis* (L.)	1	0	—	—	1	0	—	—							
13.	*Buteo buteo* (L.)	—	—	1	0	1	0	—	—							
14.	*Circus aeruginosus* (L.)	3	2	6	3	9	5	56	3		+				+	

	Phalacrocoracidae															
15.	*Phalacrocorax carbo* (L.)	1	0	6	3	7	3	43	1					·	+	
	Ciconiidae															
16.	*Ciconia ciconia* (L.)	—	—	2	1	2	1		1			+				
	Ardeidae															
17.	*Ardea cinerea* L.	16	5	1	0	17	5	29	2						+	+
18.	*Botaurus stellaris* (L.)	—	—	4	2	4	2		1						+	
	Podicipedidae															
19.	*Podiceps cristatus* (L.)	52	9	75	18	127	27	21	2					+		+
20.	*Podiceps griseigena* (Bodd.)	5	3	4	1	9	4	44	2				+			+
	Rallidae															
21.	*Fulica atra* (L.)	84	17	102	21	186	38	20	5	+			+		+	+
22.	*Gallinula chloropus* (L.)	2	0	—	—	2	0	—	—							
23.	*Rallus aquaticus* L.	—	—	1	0	1	0	—	—							
	Laridae															
24.	*Chlidonias nigra* (L.)	—	—	13	1	13	1	8	1				+			
25.	*Larus canus* L.	—	—	11	0	11	0	—	—							
26.	*Larus fuscus* L.	—	—	1	0	1	0	—	—							
27.	*Larus ridibundus* L.	12	1	46	10	58	11	19	2				+			+
28.	*Sterna hirundo* L.	8	0	13	1	21	1	5	1				+			
29.	*Stercorarius parasiticus* (L.)	—	—	1	0	1	0	—	—							
	Total	20	1	85	12	105	13	12								

Table I (cont.)

No	Bird species	Lake Gołdapiwo		Lake Mamry Północne		Total			No. of found trematode species	*Cyclocoelidae*	*Dicrocoeliidae*	*Echinostomatidae*	*Eucotylidae*	*Renicolidae*	*Opisthorchiidae*	*Schistosomatidae*
		exam.	invad.	exam.	invad.	exam.	invad.	%								
	Charadriidae															
30.	*Actitis hypoleucos* (L.)	—	—	1	0	1	0	—	—							
31.	*Calidris alpina* (L.)	10	0	—	—	10	0	—	—							
32.	*Capella gallinago* (L.)	1	0	1	0	2	0	—	—							
33.	*Charadrius dubius* Scop.	1	0	—	—	1	0	—	—							
34.	*Tringa glareola* L.	3	0	—	—	3	0	—	—							
35.	*Tringa totanus* L.	—	—	1	1	1	1		1	+						
36.	*Tringa ochropus* L.	—	—	2	0	2	0	—	—							
37.	*Philomachus pugnax* (L.)	1	0	3	0	4	0	—	—							
38.	*Vanellus vanellus* (L.)	4	0	5	0	9	0	—	—							
	Alcedinidae															
39.	*Alcedo atthis* L.	1	0	—	—	1	0	—	—							
	Passeriformes															
40.	*Acrocephalus arundinaceus* (L.)	1	0	—	—	1	0	—	—							
41.	*Acrocephalus palustris* (Bechst.)	—	—	1	0	1	0	—	—							
42.	*Acrocephalus scirpaceus* (Herm)	1	0	—	—	1	0	—	—							
43.	*Emberiza schoeniclus* (L.)	—	—	1	0	1	0	—	—							
44.	*Hirundo rustica* L.	—	—	1	0	1	0	—	—							
45.	*Lanius collurio* L.	1	0	6	0	7	0	—	—							
46.	*Motacilla alba* L.	1	0	—	—	1	0	—	—							
47.	*Riparia riparia* (L.)	2	0	24	0	26	0	—	—							
	Together	289	93	367	87	652	180	28								

Table II

Non-intestinal trematode species found in the lakes Gołdapiwo and Mamry Północne

Trematode species	No. of found tremat.		No. of host species		No. of hosts investig.		No. of hosts invaded	
	G.	M.P.	G.	M.P.	G.	M.P.	G.	M.P.
Cyclocoelidae Kossack, 1911								
1. *Cyclocoelum microstomum* Crepl.	57	49	1	1	84	102	20	15
2. *Cyclocoelum mutabile* (Zed.)	—	9	—	2	—	5	—	2
3. *Hyptiasmus oculeus* Koss.	—	1	—	1	—	102	—	1
4. *Tracheophilus cymbium* (Dies.)	84	5	1	1	37	7	15	2
5. *Typhlocoelum cucumerinum* (Rud.)	13	7	2	3	14	7	2	3
Dicrocoeliidae Odhner, 1911								
6. *Platynosomum semifuscus* Looss	30	3	1	1	3	6	1	1
Echinostomatidae Dietz, 1909								
7. *Nephroechinostoma* sp	—	50	—	1	—	2	—	1
Eucotylidae Skrjabin, 1924								
8. *Eucotyle cohni* Skr.	6	—	1	—	5	—	1	—
9. *Eucotyle zacharovi* Skr.	131	8	2	2	42	20	9	3
10. *Eucotyle wehri* Price	2	10	1	1	6	1	1	1
11. *Tanaisia atra* (Nesl.)	40	101	1	1	84	102	4	5
12. *Tanaisia fedtschenkoi* Skr.	25	255	1	2	12	59	1	10
Renicolidae Dollfus, 1939								
13. *Renicola pinguis* (Mehl.)	143	170	1	1	52	75	3	2
Opisthorchiidae Braun, 1901								
14. *Opisthorchis longissimus* Linst.	3	7	1	2	16	10	2	3
15. *Metorchis crassiusculus* (Rud.)	9	6	1	1	3	6	1	2
16. *Metorchis xanthosomus* (Crepl.)	120	37	3	3	127	26	22	6
Schistosomatidae Looss, 1899								
17. *Bilharziella polonica* (Kow.)	787	525	9	7	144	106	61	34
18 *Giganthobilharzia monocotylea* Szid.	—	1	—	1	—	46	—	1
19. *Dendritobilharzia pulverulenta* (Braun)	36	3	4	2	137	103	14	3

Note: G. = Gołdapiwo lake
M. P. = Mamry Północne lake

Descriptions

Fam. *Cyclocoelidae* Kossack, 1911

On the lakes Gołdapiwo and Mamry Północne I found 5 species from the family *Cyclocoelidae*. There were 7 species of birds invaded by them (15% of all examined). *Cyclocoelidae* are common parasites of *Anatidae*, *Fulica atra* and *Tringa totanus*.

Table III

Occurrence of *Cyclocoelidae* in bird species

Trematode species	*Anas platyrhynchos*	*Anas strepera*	*Anas querquedula*	*Aythya fuligula*	*Aythya nyroca*	*Fulica atra*	*Tringa totanus*
Cyclocoelum mutabile		×					×
Cyclocoelum microstomum						×	
Hyptiasmus oculeus						×	
Tracheophilus cymbium	×						
Typhlocoelum cucumerinum			×	×	×		

1. *Cyclocoelum microstomum* (Creplin, 1829) Kossack, 1911

Geographical distribution: USSR, Germany, England, Nord and Sud America: in Poland found by Sulgostowska (1958).

Hosts: *Fulica atra* L., *F. americana* Gm., *Gallinula chloropus* L.

Habitat: trachea, air-sacks, body cavity.

Extensity and intensity of invasion: on Gołdapiwo and Mamry Północne — *Fulica atra* 35/186 (1—10)*.

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* The state of invasion is given thus: „extent" or „extensity" is the correlation of the number of specimens invaded of a particular host species to the total number of specimens examined of that host; „intensity" is shown by figures in parentheses indicating the extent of the number of specimens of the particular trematodes species in the particular host individual.

2. *Cyclocoelum mutabile* (Zeder, 1800), Stossich, 1902

Geographical distribution: England, Austria, Italy, USSR, India, China, Japan, Egypt, Belg. Congo, N. America; in Poland found by Sinicyn (1897), Bezubik (1956), Sulgostowska (1958).

Host: *Fulica atra* L., *Gallinula chloropus* L., *G. chloropus indicus* Blyth., *Rallus aquaticus* L., *Capella delicata* Ord., *C. gallinago* (L.), *C. wilsoni* Temm., *Numenius arquata* (L.), *Crocetia alba* (Pall.), *Tringa erythropus* Pall., *T. t. eurynus* (Oberth.), *T. flavipes* (Gm.), *T. glareola* L.,*T. nebularia* Gunn., *T. totanus* (L.), *T. ochropus* L., *T. stagnatilis* (Bechs.), *Limosa limosa* (L.), *Actitis hypoleucos* (L.), *Calidris maritima* (Brünn.), *Vanellus vanellus* (L.), *Himantopus himantopus* (L.), *Scolopax rusticola* L., *Metopidus africanus* (Gm.), *Symphaemis semipalmata* (Gm.), *Anseranas semipalmata* (Lath.), *Cyanopica cyanea* (Pall.), *Halcion coromandus* (Lath.), *Guttera plumifera* (Cussin), *Galeoscoptes carolinensis* (L.), *Oreocincla damna aurea* (Holondre), *Momotus momotus bahamensis* (Swainson), *Urocissa flavirostris cucullata* (Blyth.), *Plegadis falcinellus* (L.), *Turdus ericetorum* Turt., *T. merula* L., *T. musicus* L., *Grus grus* (L.), *Anser anser* L., *Clangula hyemalis* (L.), *Oidemia nigra* (L.).

Habitat: trachea.

Extensity and intensity of invasion: on Mamry Północne only — *Anas strepera* 1/4 (6), *Tringa totanus* 1/1 (3).

Note: cosmopolytic species, in ducks rarely noted, in *Anas strepera* found for the first time.

3. *Hyptiasmus oculeus* Kossack, 1911

Geographical distribution: England, Germany, USSR, Palestina; in Poland found for the first time.

Hosts: *Fulica atra* L., *Porzana pusilla* (Pall.).

Habitat: eye.

Extensity and intensity of invasion: on Mamry Północne only — *Fulica atra* 1/102 (1).

4. *Tracheophilus cymbium* (Diesing, 1850), Skrjabin, 1913

Geographical distribution: Germany, France, Africa, Japan, Formosa, Australia, N. America, Brasil; in Poland recorded by Bezubik (1956) and Sulgostowska (1958).

Hosts: *Anas acuta* L., *A. crecca* (L.), *A. platyrhynchos* L., *A. strepera* L., *Aythya ferina* (L.), *A. fuligula* (L.), *A. marila* (L.), *Spatula clypeata* (L.), *Cairina moschata* (L.), *Anseranas semipalmata* (Lath.), *Clangula hyemalis*

(L.), *Sarcidiornicola melanota* (Reun.), *Plecopteris gambense* (L.), *Oidemia fusca* L., *Mergus albellus* (L.), *Somateria mollissima* (L.), *Capella gallinago* (L.), *Himantopus himantopus* (L.), *H. wilsoni.*

Habitat: trachea.

Extensity and intensity of invasion: on Gołdapiwo and Mamry Północne — *Anas platyrhynchos* 17/44 (1—22).

5. *Typhlocoelum cucumerinum* (Rud., 1809), Kossack, 1911

Geographical distribution: Switzerland, England, USSR, Brasil; in Poland recorded by Bezubik (1956) and Sulgostowska (1958).

Hosts: *Anas acuta* L., *A. platyrhynchos* L., *A. strepera* L., *Aythya ferina* (L.), *A. fuligula* (L.), *A. marila* (L.), *A. nyroca* Guld., *Oidemia fursca* (L.), *Clangula hyemalis* (L.), *Somateria mollissima* (L.), *Mergus serrator* L., *M. albellus* (L.), *Spatula clypeata* L., *Prectopteris gambensis.*

Habitat: trachea and lungs.

Extensity and intensity of invasion: on Gołdapiwo and Mamry Północne — *Aythya fuligula* 2/7 (3—8), *A. nyroca* 2/10 (1—5), *Anas querquedula* 1/14 (3).

Fam. *Dicrocoelidae* Odhner, 1911

This family are represented on the lakes Gołdapiwo and Mamry Północne by one species only:

6. *Platynosomum semifuscum* Looss, 1907

Geographical distribution: Italy, USSR; in Poland noted for the first time.

Hosts: *Circaëtus gallicus* (Gm.), *Falco tinnunculus* L.

Habitat: gall bladder.

Extensity and intensity of invasion: on Gołdapiwo and Mamry Północne — *Circus aeruginosus* 2/9 (3—30).

Fam. *Echinostomatidae* Dietz, 1909

7. *Nephroechinostoma* sp.

On Mamry Północne I found in the kidney of one from two investigated specimens of *Ciconia ciconia* — 50 trematodes, which I have enumerated in the genus *Nephroechinostoma.*

Fam. *Eucotylidae* Skrjabin, 1924

On the lakes Gołdapiwo and Mamry Północne I found the total number of 5 species of trematodes — 3 of the subfamily *Eucotylinae* and 2 of the subfamily *Tanaisiinae*. There were 9 species of birds invaded by them (19.1% of all the examined). *Eucotylidae* are the common group of trematodes on both the lakes. They are parasites of *Anatidae*, *Laridae*, *Podicipedidae* and *Fulica*. The majority of the found species shows a broad specificity. The greatest intensity of occurrence shows *Tanaisia fedtschenkoi*.

Table IV

Occurrence of *Eucotylidae* in bird species

Trematode species	*Anas platyrhynchos*	*Aythya ferina*	*Aythya fuligula*	*Aythya marila*	*Chlidonias nigra*	*Larus ridibundus*	*Sterna hirundo*	*Fulica atra*	*Podiceps griseigena*
Eucotyle cohni									×
E. zacharovi	×	×		×					
Eucotyle wehri			×						
T. atra							×	×	
T. fedtschenkoi					×	×			

8. *Eucotyle cohni* Skrjabin, 1924

Geographical distribution: USSR; in Poland found for the first time.
Hosts: *Podiceps griseigena* (Bodd.), *P. nigricollis* (Br.).
Habitat: kidneys.

Extensity and intensity of invasion: on Gołdapiwo only — *Podiceps griseigena* 1/5 (6).

9. *Eucotyle zacharovi* Skrjabin, 1920

Geographical distribution: USSR; in Poland noted by Sulgostowska (1958).

Hosts: *Aythya fuligula* (L.), *A. nyroca* (Guld.), *Anas strepera* (L.), *A. platyrhynchos* (L.).

Habitat: kidneys.

Extensity and intensity of invasion: on Gołdapiwo and Mamry Północne — *Anas platyrhynchos* 9/44 (2—38), *Aythya ferina* 2/18 (3—4), *A. marila* 1/5 (30).

Note: *Eucotyle zacharovi* belongs to the common parasites of the kidneys of ducks in Mazury-land. In *Aythya ferina* and *A. marila* noted for the first time.

10. *Eucotyle wehri* Price, 1930

Geographical distribution: Nord America; in Poland and in Europe noted for the first time.

Hosts: *Querquedula discors* L.

Habitat: kidneys.

Extensity and intensity of invasion: on Gołdapiwo and Mamry Północne — *Aythya fuligula* 2/7 (2—10).

Note: *A. fuligula* is a new host for *E. wehri* Price. See Table V.

Table V

Eucotyle wehri Price — measurements in μ

	Price, 1930	Sulgostowska, 1960
Length of body	2400	2670 — 3000
Width of body	387	450 — 615
Fore wall of the oral sucker	387	360 — 480
Oral sucker	170	150 — 195 × 180 — 225
Pharynx	78	127 — 150 × 150 — 180
Oesophagus	233	195 — 270
Testes	112 × 75	255 — 375 × 120 — 255
Ovarium	111 × 75	150 — 210 × 180 — 195
The testes-ovarium space	150	105 — 180
Vesicula seminalis	150 × 75	135 — 225 × 90 — 120
Vitellaria	—	750 — 1155
The vitellaria-front of the body spece	—	450 — 525
The vitellaria-end of the body space	—	1200 — 1500
Ova	30—33 × 15—18	33 — 36 × 18 — 20

11. *Tanaisia atra* (Neslobinsky, 1926)

Synonym: *Tanaisia longivitellata* Strom 1947.

Geographical distribution: USSR, Macedonia, N. America; in Poland noted for the first time.

Hosts: *Fulica atra* (L.), *F. americana* Gm., *Porzana bailloni*.

Extensity and intensity of invasion: on Gołdapiwo and Mamry Północne — *Fulica atra* 9/186 (6—50), *Sterna hirundo* 1/21 (10).

Note: Neslobinsky, 1926 found in *Fulica atra* kidney a new species of trematodes belonging to the *Eucotylidae* family. Considering it impossible to include it into any of the existing genera of this family — *Eucotyle, Tanaisia* and *Tamerlania* — he created a new genus: *Lepidopteria.* In describing the genus Neslobinsky took into account first of all the following three unsubstancial characteristics: absence of oesophagus, morphology and disposition of testes, morphology of ovary. Byrd et Denton, 1950 have revided the *Lepidopteria* genus on the basis of material collected in America. They found that the characteristics serving as foundation for this genus definition were unstable. This authorized the authors to reduce the *Lepidopteria* genus to a mere synonym of that of *Tanaisia.* This opinion was supported by Teixeira de Freitas, 1951. The question of the generic name seems thus to be definitively solved.

Table VI

Tanaisia atra (Neslob.) — measurements in μ

	Neslob., 1926	Strom, 1957	Sulgostowska, 1960
Length of body	3200	3680	2265—4050
Width of body	400	460	240—630
Oral sucker	100	163—223	105—160×135—220
Pharynx	—	60×80	40—75×47—90
End of intestine-end of body space	—	280	180—315
Testes	200 — 300	137—128×171—237	180—705×90—345
Ovarium	160 — 200	188—231	150—390+105—315
Vesicula seminalis	80	87×57	58—165×34—105
Vitellaria	200	2420	1230—2550
Ova	20 × 14	27—30×12—13	29—32×12—14

A new species — *Tanaisia longivitellata* — from the kidney of *Fulica atra* caught in the USSR, was described by Strom in 1947. The description and drawings of this species resambles substantially the data Neslobinsky, 1926 gives on the *Tanaisia* (= *Lepidopteria) atra* the only main difference consisting in the *T. atra* intestine not being connected (in contrast to *T. longivitellata*). As the intestine connection is one of the main characteristics of the *Tanaisia* genus, Neslobinsky should emphasize this inverse character when describing the new genus of *Lepidopteria.* But he merely mentioned it in the text and in the diagram of *Tanaisia* (-*Lepidopteria*) *atra.*

Consequently he should consider this difference unsignificant one or did not feel quite sure as to it presence for the convolutions of the uterus fill up the space between the intestinal branches, the posterior testis and the end of the body so tightly that the connection of the intestine is scarcely visible if at all.

I analysed the descriptions and drawings of Neslobinsky and Strom as well as the material collected by myself (135 spe-

Fig. 1. *Lepidopteria atra* Neslob., 1926 — after Neslobinsky, 1926
Fig. 2. *Tanaisia longivitellata* Strom, 1947 — after Strom, 1947
Fig. 3. *Tanaisia atra* (Neslob., 1926) — orig. — Sulgostowska

cimens in all) and arrived at the conclusion that in both cases one and the same species was ment. My specimens were identical with those described by Strom and only slightly differed from those of Neslobinsky. Following conclusions ensued from the analysis:

1. I shall classify my specimens as *Tanaisia longivitellata* Strom;

2. *T. longivitella* Strom is almost identical with *T. atra* (Neslobinsky), the main differences consisting in the following:

Neslobinsky, 1926	Strom, 1947	Sulgostowska, 1960
a. Butterfly-shaped ovary	Indefined shape of ovary	Ovary in shape of butterfly, trapezium, formless lump, i. e. variable
b. non connected intestine	connected intestine	connected intestine

I consider "a" as variable, and "b" as questionable;

3. Consequently I consider that, for the reasons mentioned above, the name "*T. longivitellata*" is to be ranged among the synonyms of the *Tanaisia atra* on the ground of priority of the description of the latter.

12. *Tanaisia fedtschenkoi* Skrjabin, 1924

Geographical distribution: USSR, Germany, Yugoslavia, N. America; in Poland recorded by Ejsmont (1931) and Sulgostowska (1958.

Hosts: *Larus cachinnans* Pall., *L. canus* L., *L. minutus* Pall., *L. ridibundus* L., *L. r. sibiricus* But., *Sterna anglica* Mon., *St. hirundo L.*, *Chlidonia leucoptera* (Temm.), *Chl. nigra* (L.), *Himantopus himantopus* (L.), *Tringa glareola* L., *T. nebularia* (Gunn.), *T. totanus* (L.), *T. ochropus* L., *T. stagnatilis* (Bechst.), *Calidris minuta* (Leisl.), *Pelidna alpina zakhalida* (Vieil.), *Chettusia leucura* (Licht.), *Oxyechus vociferus vociferus* L., *Capella delicata* (Ord.), *Charadrius dubius* Scop., *Vanellus vanellus* (L.), *Numenius arquata* (L.), *Limosa limosa* (L.), *Phalaropus lobatus* (L.), *Rallus aquaticus* L., *Plegadis falcinellus* (L.), *Corvus cornix* L., *Motacilla flava beema* Sykas.

Habitat: kidneys.

Extensity and intensity of invasion: on Gołdapiwo and Mamry Północne — *Larus ridibundus* 10/58 (5—100), *Chlidonias nigra* 1/13 (2).

Note: *T. fedtschenkoi* belongs to the common parasites of *Laridae* in the Mazury-land. I observed while treating the material collected that the shape of the individual specimens was dependent on the

total number of parasites in the population. Increased population density inhibited normal development of the individuals (Sulgostowska, 1958).

Fam. *Renicolidae* Dollfus, 1939

13. *Renicola pinguis* (Mehlis, 1931), Cohn, 1904

Geographical distribution: Germany, England, USSR; in Poland found for the first time.

Hosts: *Podiceps cristatus* L.

Habitat: kidneys.

Extensity and intensity of invasion: on Gołdapiwo and Mamry Północne — *Podiceps cristatus* 5/127 (20—150).

Table VII

Renicola pinguis (Mehlis) — measurements in μ — orig.

Length of body	1230—2205
Width of body	795—1380
Oral sucker	120—180×225—405
Pharynx	70—75×81—105
Vitellaria	300—525
Ova	45—48×20—27

Fam. *Opisthorchiidae* Braun, 1901

I found on the Gołdapiwo and Mamry Północne lakes 3 species belonging to this family. There was a total number of 8 species of birds (17% of all examined) invaded by them. The found parasites shows a broad specificity.

Table VIII

Occurrence of *Opisthorchiidae* in bird species

Trematode species	*Anas platyrhynchos*	*Aythya ferina*	*Aythya fuligula*	*Ardea cinerea*	*Botaurus stellaris*	*Phalacrocorax carbo*	*Circus aeruginosus*	*Fulica atra*
Metorchis crassiusculus							×	
Metorchis xanthosomus	×	×	×			×		×
Opisthorchis longissimus				×	×		×	

14. *Metorchis crassiusculus* (Rud., 1809), Looss, 1899

Geographical distribution: Germany, England, USSR, Nord Africa; from Poland recorded by Kowalewski (1899).

Hosts: *Aquila chrysaëtos* (L.), *Buteo buteo* (L.), *B. lagopus* (Br.), *Circus aeruginosus* (L.), *Haliaeëtus albicilla* (L.), *Nyctea nyctea* (L.).

Habitat: gall bladder.

Extensity and intensity of invasion: on Gołdapiwo and Mamry Północne — *Circus aeruginosus* 3/9 (1—9).

15. *Metorchis xanthosomus* (Creplin, 1846), Braun, 1902

Geographical distribution: Europa, USSR; in Poland noted by Kowalewski (1898).

Hosts: *Anas platyrhynchos* L., *A. querquedula* L., *Aythya fuligula* (L.), *Mergus serrator* L, *Oidemia nigra* L., *Colymbus nigricans* Scop., *C. stellatus* Pont., *Podiceps minor*, *Alca torda* L., *Porphyrio porphyrio*, *Leptoptilus argala*, *Spheniscus demersus*.

Habitat: gall bladder.

Extensity and intensity of invasion: on Gołdapiwo and Mamry Północne — *Phalacrocorax carbo* 3/7 (5—15), *Aythya fuligula* 1/7 (6), *A. ferina* 2/18 (2—5), *Anas platyrhynchos* 6/44 (1—8), *Fulica atra* 16/186 (1—50).

Note: *Metorchis xanthosomus* parasiting in *Fulica atra* and in *Phalacrocorax carbo* was noted for the first time so far. I classified the *M. crassiusculus* and *M. xanthosomus* after the host only, and not according to its species characteristics. Even Braun, 1902 who described the species *M. xanthosomus* did not emphasize any principial differences between the *M. crassiusculus* and *M. xanthosomus* differentiating them rather from the point of view of their specificity to the different hosts. Heinemann, 1936 considers the genus *Metorchis* phylogenetically wery young and this is the reason why the characteristics of individual species are difficult to define. In classifying the species he too adopted the criterion of the parasites specificity to the different hosts, i. e. *M. albidus* as occuring in mammals, *M. crassiusculus* — in birds of prey, and *M. xanthosomus* — in different lake birds. Similar observations made Doll-

fus, 1945 too. He considers that final classification of species belonging to the *Metorchis* genus may be completed experimentally only.

When analysing the material collected I constated but insignificant differences between *M. crassiusculus* and *M. xanthosomus*. As to the species of *M. xanthosomus* all the populations found differed from each other depending on species of the host, or on population density.

16. *Opisthorchis longissimus* Linstow, 1883

Syn. *Opisthorchis (Notaulus) asiaticus* Skrjabin, 1913.

Geographical distribution: USSR, England; in Poland found for the first time.

Hosts: *Botaurus stellaris* (L.), *Anas platyrhynchos* L., *Circus cinereus*, *Aquila heliaca* Sav.

Habitat: gall ducts of the liver.

Extensity and intensity of invasion: on Gołdapiwo and Mamry Północne — *Botaurus stellaris* 2/4 (2—3), *Ardea cinerea* 2/17 (1—2), *Circus aeruginosus* 1/9 (2).

Table IX

Opisthorchis longissimus Linstow — measurements in μ

	Linstow, 1883	Skrjabin, 1913	Sulgostowska, 1960	
	Bot. stellaris	*C. cinereus*	*C. aeruginosus*	*Bot. stellaris*
Length of body	20000—24000	13600—14000	8000	11000
Width of body	700—1000	1090	510	—
Oral sucker	140—385 × 175—525	85×136—165	105×135	135×153
Pharynx	140—315	136×102—127	105×102	127×144
Ventral sucker	227—340	170	180	195×195
Testis I	962×665	—	187×408	510×510
Testis II	875×525	—	408×476	544×425
Ovarium	612×525	—	476×459	340×510
Ova	24—28×15	26—29×14—15	12×24	12×24

Fig. 4. *Opisthorchis longissimus* Linstow, 1883; left — from *Botaurus stellaris;* right — from *Circus aeruginosus* — orig.

Note: Linstow, 1883 described the species *Opisthorchis longissimus* found in the liver of *Botaurus stellaris*. A very similar trematode was found by Skrjabin, 1913 in the liver of *Circus cinereus*. He not only described it as a new species but had even created a new genus — *Notaulus* — founding his opinion, first of all, on the shape of testes. He named the species *Notaulus asiaticus*. — Morgan, 1927 has proved that the shape of the testes in the *Opisthorchis* genus represents a variable characteristics and may not be considered as taxonomic one. For this reason he deduced the *Notaulus* genus to the synonyms of the *Opisthorchis*. — Erhardt, 1936 who was studying the geographical spread of the genus *Opisthorchis*, included *Opisthorchis* (= *Notaulus*) *asiaticus* among the geographical forms of *O. longissimus*.

On the territory examined I found trematodes in which characteristics of *O. longissimus* as well as those of *O. (Notaulus) asiaticus* combined together in the gall bladder of *Botaurus stellaris* (the description of *O. longissimus* was made after a specimen taken exactly from this host), in *Circus aeruginosus* (*Notaulus asiaticus* description was made after a specimen from this host), and in *Ardea cinerea* in which the species discussed was noted for the first time.

Parasites occuring in *Botaurus stellaris* were larger than in *Circus aeruginosus*. I consider however that the morphological differences were caused by specificity, i. e. that trematodes belonging to one species adapted themselves differently to different hosts. It came true in many species of parasites.

This is the reason why I conclude than *O.* (= *Notaulus*) *asiaticus* does not represent a geographical form of *O. longissimus* but constitutes an *O. longissimus* variety determined dy the host. Thus *Opisthorchis* (= *Notaulus*) *asiaticus* Skrjabin, 1913 is to be included into the synonyms of *Opisthorchis longissimus* Linstow, 1883.

Fam. *Schistosomatidae* Looss, 1899

I found on the lakes Gołdapiwo and Mamry Północne 3 species of trematodes belonging to this family. There was a total number of 12 species of birds (25% of all examined) invaded by them. The main hosts on the investigated area are ducks.

Table X

Occurrence of *Schistosomatidae* in bird species

Trematode species	*Anas crecca*	*Anas platyrhynchos*	*Anas querquedula*	*Aythya ferina*	*Aythya fuligula*	*Aythya marila*	*Aythya nyroca*	*Podiceps cristatus*	*Podiceps griseigena*	*Ardea cinerea*	*Fulica atra*	*Larus ridibundus*
Bilharziella polonica		×	×	×	×	×	×	×	×	×		
Dendritobilharzia pulverulenta	×	×	×	×							×	
Giganthobilharzia monocotylea												×

17. *Bilharziella polonica* (Kowalewski, 1895), Looss 1899

Geographical distribution: Germany, Italy, England, USSR, Nord America; in Poland recorded by Kowalewski (1895), Ejsmont (1931), Bezubik (1956)

Hosts: *Anas acuta* L., *A. crecca* L., *A. platyrhynchos* L., *A. platyrhynchos domestica* L., *A. querquedula* L., *Aythya ferina* (L.), *A. fuligula* (L.), *A. nyroca* (Guld.), *Bucephala clangula* (L.), *Spatula clypeata* (L.), *Mergus albellus* L., *Anser anser dom.* (L.), *Tringa ochropus* L., *Cygnus olor* (Gm.), *Ardea cinerea* L., *Podiceps cristatus* (L.), *P. griseigena* (Bodd.).

Habitat: blood vessels of liver and intestine.

Extensity and intensity of invasion: on Gołdapiwo and Mamry Północne — *Anas platyrhynchos* 35/44 (4—35), *A. querquedula* 11/14 (1—32), *Aythya ferina* 10/18 (5—68), *A. fuligula* 3/7 (6—66), *A. marila* 2/5 (2—3), *A. nyroca* 3/10 (1—115), *Podiceps griseigena* 4/9 (2—7), *P. cristatus* 22/127 (2—7), *Ardea cinerea* 5/17 (1—2).

Note: Almost all the trematodes found are the males; the females are very rare. *Aythya marila* on Gołdapiwo and *Podiceps cristatus* and *P. griseigena* on Drużno lake (Sulgostowska 1958) are the new host of *B. polonica.*

18. *Dendritobilharzia pulverulenta* (Braun, 1901), Skrjabin, 1924

Geographical distribution: England, USSR, Africa; in Poland recorded by Ejsmont (1931) and Sulgostowska (1958).

Hosts: *Anas crecca* L., *A. platyrhynchos* L., *A. querquedula* L., *Aythya ferina* (L.), *Fulica atra* L.

Habitat: blood system; in my material — heart, kidneys, lungs.

Extensity and intensity of invasion: on Gołdapiwo and Mamry Północne — *Anas crecca* 1/1 (1), *A. querquedula* 2/14 (1—2), *A. platyrhynchos* 2/44 (1—3), *Aythya fuligula* 1/7 (8), *F. atra* 11/186 (1—5).

Note: *D. pulverulenta* occurs quite often on the investigated lakes; in *Aythya fuligula* noted for the first time.

19. *Giganthobilharzia monocotylea* Szidat, 1930

Geographical distribution: Germany; in Poland noted for the first time.

Hosts: *Larus ridibundus* L., *Podiceps cristatus* (L.), *Anas platyrhynchos* L.

Habitat: abdominal blood vessels.

Extensity and intensity of invasion: on Mamry Północne — *Larus ridibundus* 1/46 (1). The found individual was a male.

Note: In the abdominal blood vessels of *Larus ridibundus* caught in the vicinity of Rossitten (North Prussia), Wagner, 1929 found a species (male) which he classified as belonging to the *Giganthobilharzia* genus. Approximately at the same time Szidat, 1930 found the same species too (male and female) in *Larus ridibundus* and in *Anas platyrhynchos* and described it as *G. monocotylea*. Only a part of the body was found in both cases (♂ and ♀) and therefore Szidat has given incomplete data in his work.

Table XI

Giganthobilharzia monocotylea Szidat — measurements in μ

	Szidat, 1930	Sulgostowska, 1960
Length of the found fragment	7000	4000
Width before the vesic. semin.	90	45
Width behind the vesic. semin.	15	15
Oral sucker	20 × 25	18 × 20
Oesophagus	300	285
Vesicula seminalis		600
Ves. seminal. — testes space		2025

I too found only the front portion of a male's body. The dimensions of my specimen are given in table XI in order to supplement Szidat's description.

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STRESZCZENIE

Autorka zbadała w latach 1954 i 1955 na jeziorze Gołdapiwo i w latach 1956 i 1957 na jeziorze Mamry Północne — 652 ptaki wymienione w tabeli I. U 180 ptaków (27,6% wszystkich zbadanych) znalazła 19 gatunków przywr pozajelitowych z rodzin: *Cyclocoelidae, Dicrocoeliidae, Echinostomatidae, Eucotylidae, Renicolidae, Opisthorchiidae, Schistosomatidae.*

Autorka omawia występowanie ilościowe i jakościowe znalezionych gatunków przywr. Spośród 19 gatunków przywr — 9 notuje po raz pierwszy w Polsce; dla 7 gatunków stwierdza nowego żywiciela.

Przeprowadza rewizję gatunku *Tanaisia longivitellata* Strom, 1947 i sprowadza go do synonimów *Tanaisia atra* Neslobinsky, 1926.

Przeprowadza rewizję gatunku *Notaulus asiaticus* Skrjabin, 1913 i sprowadza go do synonimów *Opisthorchis longissimus* Linstow, 1883.